WHAT IS CLAIMED IS:

1. An optical routing apparatus for directing an optical signal, the optical routing apparatus comprising:

(a) an input port configured to provide the optical signal;

(b) a plurality of output ports, each such output port being configured to receive the optical signal, wherein the input port and at least one of the output ports lie in different parallel planes, each such plane being orthogonal to a path along which the optical signal may be provided by the input port or received by the at least one of the output ports; and

(c) an optical switching arrangement adapted to shift among a plurality of distinct optical configurations to direct the optical signal from the input port to one of the output ports.

2. The optical routing apparatus according to claim 1 wherein all path lengths defined by the distinct optical configurations of the optical switching arrangement from the input port to each output port differ by less than a confocal length of the optical signal.

3. The optical routing apparatus according to claim 1 wherein all path lengths defined by the distinct optical configurations of the optical switching arrangement from the input port to each output port are approximately equal.

4. The optical routing apparatus according to claim 1 wherein two of the output ports lie in the same plane, such plane being orthogonal to a path along which the optical signal may be received by either of the two output ports.

5. The optical routing apparatus according to claim 1 wherein the optical switching arrangement includes a rotatable mirror off which the optical signal is reflected in at least one of the distinct optical configurations.

6. The optical routing apparatus according to claim 1 wherein the optical switching arrangement includes a linearly actuated mirror off which the optical signal is reflected in at least one of the distinct optical configurations.

7. The optical routing apparatus according to claim 1 wherein the optical switching arrangement is configured to direct a plurality of optical signals.

8. A method for directing an optical signal, the method comprising:

(a) providing the optical signal from an input port; and

(b) operating an optical switching arrangement adapted to shift among a plurality of distinct optical configurations to direct the optical signal to one of a plurality of output ports, wherein the input port and at least one of the output ports lie in different parallel planes, each such plane being orthogonal to a path along which the optical signal is provided by the input port or received by the at least one of the output ports.

9. The method according to claim 8 wherein all path lengths defined by the distinct optical configurations of the optical switching arrangement from the input port to each output port differ by less than a confocal length of the optical signal.

10. The method according to claim 8 wherein all path lengths defined by the distinct optical configurations of the optical switching arrangement from the input port to each output port are approximately equal.

11. The method according to claim 8 wherein two of the output ports lie in the same plane, such plane being orthogonal to a path along which the optical signal is received by either of the two output ports.

12. The method according to claim 8 wherein the optical switching arrangement includes a rotatable mirror off which the optical signal is reflected in at least one of the distinct optical configurations.

13. The method according to claim 8 wherein the optical switching arrangement includes a linearly actuated mirror off which the optical signal is reflected in at least one of the distinct optical configurations.

14. The method according to claim 8 wherein the optical switching arrangement is configured to direct a plurality of optical signals.

15. A wavelength router for receiving, at an input port, light having a plurality of spectral bands and directing subsets of the spectral bands, the wavelength router comprising:

(a) a plurality of output ports for receiving the directed spectral bands, wherein the input port and at least one of the output ports lie in different parallel planes, each

such plane being orthogonal to a path along which one of the directed spectral bands may be received by the at least one of the output ports;

(b) a free-space optical train disposed between the input port and the output ports providing optical paths for routing the spectral bands, the optical train including a dispersive element disposed to intercept light traveling from the input port; and

(c) an array of optical routing mechanisms having a dynamically configurable routing element, each optical routing mechanism being configured to direct a given spectral band to one of the output ports.

16. The wavelength router according to claim 15 wherein the dispersive element is a grating.

17. The wavelength router according to claim 16 wherein the optical train includes focussing power incorporated into the grating.

18. The wavelength router according to claim 16 wherein the grating is a reflective grating.

19. The wavelength router according to claim 16 wherein the grating is a transmissive grating.

20. The wavelength router according to claim 15 wherein all path lengths for a particular spectral band defined by a given optical routing mechanism from the input port to the output ports differ by less than a confocal length of the particular spectral band.

21. The wavelength router according to claim 15 wherein all path lengths for a particular spectral band defined by a given optical routing mechanism from the input port to the output ports are approximately equal.

22. The wavelength router according to claim 15 wherein two of the output ports lies in the same plane, such plane being orthogonal to a path along which a particular spectral band may be received by either of the two output ports.

23. The wavelength router according to claim 15 wherein the dynamically configurable routing element comprises a rotatable mirror off which a given spectral band is reflected in one configuration.

24. The wavelength router according to claim 15 wherein the dynamically configurable routing element comprises a linearly actuated mirror off which a given spectral band is reflected in one configuration.

09/760,044 - 122000